

REMARKS

As a preliminary matter, Applicants have included a corrected 1449 form to correct the Information Disclosure Statement filed October 12, 2001. This form corrects a typographical error wherein the submitted document "4-311811" was incorrectly listed as document "4-211811" in the originally filed 1449 form.

Claim 6 is objected to because of improper Markush language. In response, Applicants have amended claim 6 as suggested by the Examiner and request withdrawal of the objection on this basis.

Claims 1, 3, and 6-7 stand rejected under 35 U.S.C. 103(a) as being obvious over Ando et al. (IEEE Trans. Mag., 33(5), 1997, 2983-2985). Applicants respectfully traverse the rejection because Ando et al. describe a soft magnetic layer between the pinned and perpendicular layers, where the present invention has a pinned layer adjacent a perpendicular layer, without a soft magnetic layer.

The Examiner considers the pinning layer shown in Fig. 1 of the Ando et al. reference to be equivalent to the in-plane magnetic film of the present invention. The perpendicular layer also shown in Fig. 1 of the Ando et al. reference is considered to be equivalent to the perpendicular magnetic film of the present invention. However, the pinning layer of the Ando et al. reference is used because the medium functions with a soft magnetic layer which is provided between the other two layers.

In contrast, the present invention provides that the in-plane magnetic film is

formed on the perpendicular magnetic film, without sandwiching a soft magnetic layer. If the Ando et al. recording medium were modified by eliminating the soft magnetic layer the recording media could not work. For this reason, this would not have been an obvious modification.

Additionally, since the pinning layer of the Ando et al. reference pins the magnetic domain of the soft magnetic underlayer provided thereon, it is believed by Applicants that the pinning layer and the perpendicular layer (*i.e.*, the perpendicular magnetic film) do not have related values of tBr , thickness, or H_c . Rather, the values of tBr , thickness, and H_c of the pinning layer are determined with respect to the soft magnetic underlayer provided thereon. Since there is no soft magnetic layer in the present invention, one would not be motivated to optimize the tBr product relationship of the perpendicular magnetic film, as recited in the present invention, so that it does not exceed one-fifth of the tBr of an in-plane magnetic film at the maximum.

Furthermore, the dependency of the perpendicular layer on the thickness as shown in Fig. 4 of the Ando et al. reference is a phenomenon observed only in perpendicular recording media having a two-layer structure without a pinning layer. Therefore, Applicants believe that Fig. 4 of the Ando et al. reference does not disclose or suggest a relation between the thickness and the pinning layer.

With respect to claim 7, the Examiner indicates that the limitation "used for recording" is an intended use/functional limitation. However, in the Ando et al. reference the

recording media have structures limited to perpendicular recording in which the pinning layer is used for pinning a magnetic domain of the soft magnetic underlayer. Thus, Applicants believe that the Ando et al. reference and the present invention appear to be fundamentally different, and the use of the in-plane film for recording should be given patentable weight.

For these reasons, withdrawal to the rejection to claims 1 and 7 is respectfully requested. Claims 3 and 6 are dependent from claim 1, and are considered allowable for the reasons stated with respect to the rejection of claim 1.

Claims 1-3 and 6-7 stand rejected under 35 U.S.C. 103(a) as being obvious over Futamoto et al. (U.S. Patent Application Publication No. 2003/0022025 A1). In response, Applicants respectfully traverse the rejection.

The Examiner considers the soft magnetic layer/film 72 shown in Fig. 8 of the Futamoto et al. reference to be equivalent to the in-plane magnetic film of the present invention, and the perpendicular magnetization film 71 to be equivalent to the perpendicular magnetic film.

However, the Futamoto et al. reference is characterized in that the soft magnetic layer/film 72 (*i.e.*, the in-plane magnetic film) is never positioned under the perpendicular magnetization film 71 (*i.e.*, the perpendicular magnetic film). In addition, the in-plane magnetic film is a soft magnetic layer, and recording is executed on the perpendicular magnetization film 71. Thus, Applicants believe that the Futamoto et al. reference and the present invention are fundamentally different.

Moreover, the Futamoto et al. reference functions to stabilize a magnetization of the recording layer 71. In this manner, a structure is disclosed wherein the soft magnetic layer 72 is interposed under a hard protection layer 15.

In contrast, the present invention has a perpendicularly oriented thin film (*i.e.*, a perpendicular magnetic film) that is interposed on an in-plane oriented hard magnetic recording layer (*i.e.*, an in-plane magnetic film). Thus, the present invention does not have a structure with a soft magnetic layer, as in the Futamoto et al. reference, but a semi-hard or hard film which maintains the perpendicular orientation of the perpendicular magnetic film that is provided on the recording layer (*i.e.*, the in-plane magnetic film). Therefore, the present invention is considered different from the media of the Futamoto et al. reference.

As previously stated, in the Futamoto et al. reference, the soft magnetic layer/film 72 is positioned on the perpendicular magnetization film 71, whereas in the present invention the in-plane magnetic film is positioned under the perpendicular magnetic film. Accordingly, in the Futamoto et al. reference the soft magnetic layer/film 72 is thinner than the perpendicular magnetization film 71, whereas in the present invention the in-plane magnetic film is thicker than the perpendicular magnetic film. Because of these structural differences in position and thickness, Applicants believe that the Futamoto et al. reference does not disclose or suggest that an anisotropic magnetic field H_k of the perpendicular magnetization film 71 is at least 1.2 times as large as an anisotropic magnetic field H_k of the soft magnetic layer/film 72. Accordingly, withdrawal of the rejection to claims 1-3 and 6-7

is respectfully requested.

Claims 1 and 3-7 stand rejected under 35 U.S.C. 103(a) as being obvious over Kawato et al. (U.S. Patent Application Publication No. 2002/0028356 A1). Applicants respectfully traverse the rejection.

The Examiner considers magnetic under layer 76/80 and Co-based amorphous ferromagnetic layer 105 of the Kawato et al. reference to be equivalent to the in-plane magnetic film of the present invention, and the perpendicular magnetic layer 107 to be equivalent to the perpendicular magnetic film.

However, the Kawato et al. reference relates to perpendicular magnetic recording, whereas the present invention relates to in-plane magnetic recording. Thus, the Kawato et al. reference is fundamentally different basis from the present invention. Accordingly, it cannot be considered that the Co-based amorphous ferromagnetic layer 105 of the Kawato et al. reference is equivalent to the in-plane magnetic film of the present invention. Additionally, the Co-based amorphous ferromagnetic layer 105 of Kawato et al., having a thickness of 20nm, is thinner than the perpendicular magnetic layer 107 (CoCrPtB), which has a thickness of 30nm. Therefore, Applicants believe that the Kawato et al. reference does not disclose or suggest that a tBr of the perpendicular magnetic layer 107 does not exceed one-fifth of a tBr of the Co-based amorphous ferromagnetic layer 105. Similarly, Applicants believe that the Kawato et al. reference does not disclose or suggest that an anisotropic magnetic field H_k of the perpendicular magnetic layer 107 is at least 1.2 times as

large as an anisotropic magnetic field H_k of the Co-based amorphous ferromagnetic layer 105. For these reasons, withdrawal to the rejection to claims 1 and 3-7 is respectfully requested.

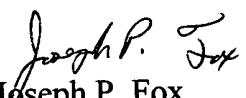
New claim 8 is a combination of claims 1, 2 and 4. Since none of the cited references, taken alone or in combination, disclose or suggest the features of this claim, allowance of new claim 8 is earnestly solicited.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. The Examiner should call Applicants attorney if an interview would expedite prosecution.

Respectfully submitted,

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